

## CHAPTER VII

### THE CARE OF THE WOUNDED

#### I.—EFFECT OF THE IMPROVEMENT IN FIREARMS UPON THE CHARACTER OF WOUNDS.

THE adoption of long-range artillery and quick-firing, small-calibre rifles with four times the energy of those employed in former wars, gives reason for fearing that not only the losses in battle will be incomparably greater than in the past, but also that the assistance of the wounded will be much more difficult. It is true that many authorities do not share these pessimistic views; in their opinion the difference in the wounds caused by the old and the new weapons being in favour of the latter. The wounds inflicted by modern weapons, they say, will be more easily cured; even when the wounded are left a long time without assistance the loss of blood will be small. The number of wounded will not be so great. According to this view the losses in future battles will be determined not alone by the power of arms, but also by those tactical methods which have been adopted as a consequence of the improvements in arms. As the result of perfected weapons, armies will seek or construct cover, and will attack in loose formation, while battles will be carried on at greater distances, all of which factors must tend to the decrease in the number of wounded. In addition to this, every soldier will be supplied with materials for dressing wounds, while blood-poisoning will be almost wholly eliminated, and the medical staffs of armies will be much stronger than before. Such are the opinions of optimists.

It is interesting to consider the proportions and nature of wounds in past wars in comparison with those inflicted by the weapons now in use.

*Injuries from Cold Steel.*—Fisher estimates the proportion of wounds inflicted by cold steel in the war of 1866 in the Austrian army at 4 per cent., and in the Prussian army at 5 per cent., of all wounds. In the war of 1870-71 the proportion of wounds caused by cold steel in the German army was 1 per cent. In the Russo-Turkish war the percentage of wounds inflicted by cold steel was 2.5 per cent. in the Russian army of the Danube. The percentage of deaths caused by cold steel is also very inconsiderable. In the last Russo-Turkish war, of the number killed in the army of the Danube only 5.3 per cent. of deaths were caused by cold steel, and in the army of the Caucasus barely 1 per cent.

*Injuries from Bullets and Shells.*—The mutual relations of injuries by rifle and artillery fire, both as to quantity and nature, present different results in previous wars. In a future war the differences will be still greater. In the past the wounds from shell-fire were many times more dangerous than those caused by rifle bullets; in the present day this would appear to have changed. The bullet of a modern rifle, weighing several grammes, has such force that it may strike five or six men, and cause even greater destruction than is caused by fragments of shells. The mutual relations of injuries from bullets and shells in a future war will depend from the manner in which the war is conducted—that is, whether it be determined chiefly by open battles or take the character of sieges.

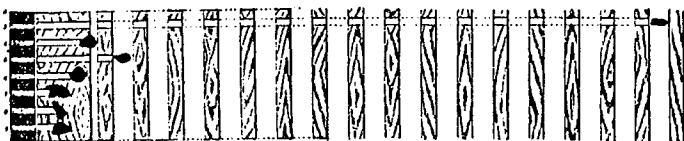
Since the adoption of rifled weapons we find that casualties have been caused mainly by bullets. Thus at the battle of Inkermann 91 per cent. of all wounds were inflicted by rifle fire. At the battle of the Tchernaya the proportion of wounds from rifle fire reached 75 per cent. Similar results took place in the Italian war, at Düppel and at Königgrätz. In the war of 1859, 80 per cent. of all wounds were caused by rifle fire, while at the storm of Düppel the proportion of bullet wounds among the

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Prussians was 80.6 per cent. The statistics given by Weygand concerning the Franco-Prussian war are as follows: Artillery fire was the cause of 25 per cent. of the losses of the French and 5 per cent. of the losses of the Germans, while rifle fire caused 70 per cent. of French and 94 per cent. of German losses.

Thanks to the introduction of smokeless powder, diminution of calibres, and the covering of bullets with steel, the infantry rifle, of all arms the most important, has been so perfected that grave questioning has arisen concerning the losses in future war. Especial alarm has been caused by the increased penetrative power of the new composite bullet over that of the old.

The following diagram illustrates the result of firing experiments from an 11-mil. rifle. The shots were fired against fifteen folds of cowhide, 3.6 inches of hard beechwood, and finally pine planks 1 inch thick, at a distance of 32½ feet from one another.



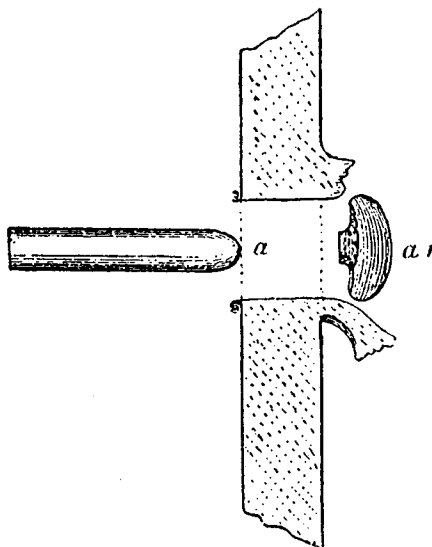
3. Compound.

4, 5, 6. Hard leaden bullets.  
7, 8, 9. Soft bullets.

From this we see that the penetrative force of the compound bullet is many times greater. It is generally accepted that a bullet which will penetrate an inch of pine has sufficient force to kill or wound a man or horse.

But even here invention has not stopped. The sketch on page 150 shows the action of a 5.5-mil. bullet fired with an initial velocity of about 2600 feet against a 14-mil. steel plate. The force of this bullet was sufficient, from a distance of 81¼ feet, to penetrate the plate, the bullet, on issuing from the plate taking the form of a mushroom.

In view of the small diameter of bullets and the force with which they penetrate the body, the German surgeons Reger and Beck, and, to some extent, Bruns, consider that wounds from the new bullets will be less terrible than those caused by the old, in consequence of which they have given to these bullets the title "humane." In an address read in 1885 by Reger to the Berlin Military Medical Society,



we find the following expression of opinion : "I welcome the new bullet with great joy and believe that if it were generally adopted by international consent, all humanity would have cause to rejoice." Similar views have been expressed by Bruns, who considers that the new bullet is not only the most effective, but also the most humane, tending to decrease the horrors of war.

But it must not be supposed that these views were unanimously held. As far back as the Franco-German war we find that both combatants reproached one another with the employment of explosive bullets. The foundation for

these accusations was the fact that ordinary bullet wounds often took the character of wounds caused by explosive bullets. A closer acquaintance with facts would have prevented these accusations. Numerous experiments which have been made show that bullets fired at great initial velocity (not less than  $812\frac{1}{2}$ –975 feet) cause injuries similar to those caused by explosive bullets. Various attempts have been made to explain this circumstance. The opinion most widely accepted is that an explosive effect is produced when the bullet falls in some organ rich in liquids, the liquids being cast on all sides with destructive action on the neighbouring tissues similar to that of an explosion. This theory is elaborated by Reger in particular.

As modern rifles are immensely superior to those of former times, both in range, accuracy and power, it would seem natural to expect a greater proportion of mortal wounds than before. If this be so, it is difficult to see how they deserve the title "humane." It must first of all be stated that against the immense force with which modern bullets move, the opposition of the human body has little power to arrest their movement. The experiments of Bruns, in which a bullet fired from a distance of 2600–3900 feet penetrated 2–3 human corpses one behind the other, and fired from a distance of 400 metres penetrated 4–5 bodies, even the strongest bones of the human body being shattered, have not only been confirmed but strengthened by later investigations, which showed that at any distance up to 6500 feet the penetrating force of a composite bullet was sufficient to pierce several bones.

The absolute number of wounded in war, even with an equal number of combatants, must be incomparably greater than before. The causes of this are obvious : the increased quantity of ammunition expended per man, rapidity of fire, increased range, greater accuracy, smokeless powder, and greater penetrative force, thanks to which many forms of cover, formerly effectually protecting the soldier will be of no value.

Professor Bardeleben draws a melancholy picture of the

action of the new weapons. He agrees that the number of wounded in the course of a given time will increase, not only because the magazine rifle allows the discharge of many more bullets than formerly, but because one bullet will strike three or four men, one behind the other, it may be even more. On the other hand, he finds that the proportion of killed on the field of battle will increase in consequence of the increased force of the blow. Fired from a distance at which the old bullet was stopped by the skull or the ribs, the modern bullet will penetrate to the brain and heart.

The sketches of Bircher (opposite page) give some idea of the effect of fire at long range. These experiments were carried on in Switzerland with the 7.5-mil. bullet at a distance of 9750 feet and 11,375 feet.

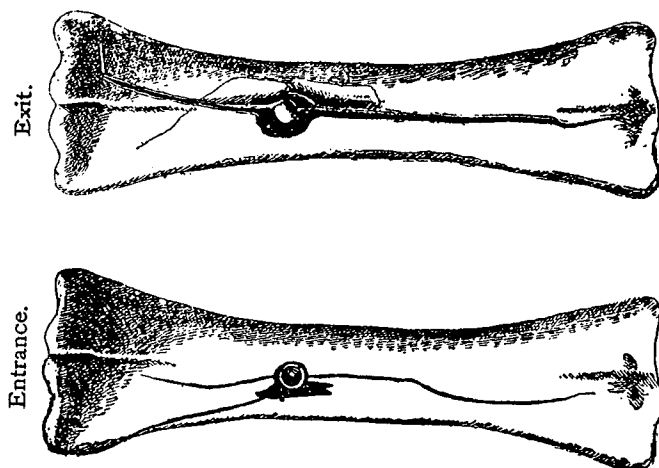
Such shattering of the bones at a distance of 9750 feet and 11,375 feet will be comparatively rare. In the zone of actual fire cases of shattered bones will be more frequent and more serious; and the mortality will be greater in consequence of greater loss of blood resulting from direct injury to the blood-vessels.

As relates to the wounds caused by artillery fire, as a great part of these wounds will be caused by the fragments and bullets of shrapnel, it may be assumed that the injuries they inflict will differ little from those inflicted in past wars.

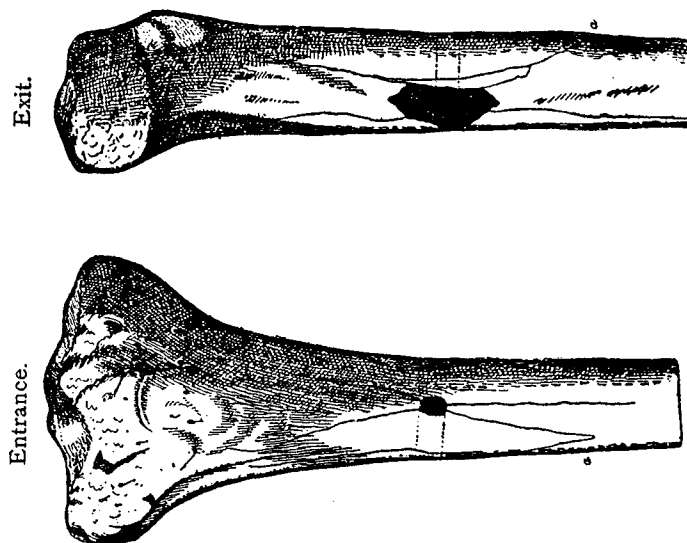
## II.—HELP TO THE WOUNDED.

Not only may we expect that the quantity of wounds and sickness will increase in future wars, but the assistance of the wounded and sick will be much more difficult than in the past. It must be noted that this side of the question has received little attention. The whole attention of specialists has been bent upon the increase of the deadliness of weapons of extermination, and upon the strengthening of armies. The chief physician of the Bavarian army, Porth, calls attention to this fact, and declares that the German strategists in the race after

*Effect of a Bullet fired from a distance of 3500 metres on the bone of an Ox.*



*Effect of a Bullet fired from a distance of 3500 metres on the Human Tibia.*



perfection of weapons of extermination, have left behind them all plans for the amelioration of the lot of the wounded in war. Indeed, they go even further, and refuse to grant resources for the perfection of the medical organisation, thinking that such a course would hinder military operations. Meantime, the modern weapons will cause wounds requiring, if anything, more rapid aid to the wounded than those inflicted by the old type.

In recent wars provision for the wounded generally proved inadequate. Even in the war of 1870 it was impossible to make arrangements for ambulances as easily as formerly. "Bullets and shells," says Pigorof, "carried much farther than before ; it was difficult to find a safe spot in the vicinity of the field of battle, and such a position once found was quickly rendered untenable by the rapid movements of the armies. Another element of difficulty lies in the fact that all stations for dressing wounds in modern wars are quickly overcrowded owing to the rapidity of fire, whole files being stricken down at the same time ; in consequence there is no possibility of avoiding terrible overcrowding in the ambulances if the wounded are not sent off the field at once.

"After the battle of Weissenburg the wounded French lay two days upon the field. In the village of Remilie lay some thousands of men wounded at Gravelotte, brought thither in two days and two nights in peasants' carts, and, to attend to these thousands of wounded (nearly 10,000) during the first few days only four doctors were available." Similar was the experience after other battles of this war. Pigorof continues : "The wounded remaining after battle were named by our old servant 'garbage and bits,' and there they all lay, garbage and bits, scattered over the battlefield till some one lifted them up and bore them away. The rapidity and accuracy of modern fire are such that whole files fall together, and the accumulation of wounded in a very short time is immense."

No better was the state of affairs in the war of 1877-78. Professor Botkin says that the wounded remained not only without medical aid, but even without water for days, and



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all this thanks to the fact that no one had thought of this matter in time. The position of the wounded in hospital was also unsatisfactory. In a memorandum of the Chief Controller we find it plainly stated that the military hospitals, both in the Caucasus and in Bulgaria, were characterised by great defects, especially when compared with the institutions opened by the Red Cross Society, and at the expense of private individuals. The temporary military hospitals were supplied by the commissariat with inferior stores, and the medicine-chests were lacking in some of the most necessary remedies. The supply of the hospitals was carried on unpunctually, and sometimes resulted in a lack of medical attendance. These deficiencies were especially felt in the time of the outbreak of typhus at the close of the war.

The chief representative of the Red Cross Society, Mr. P. A. Richter, writes in his report as follows: "Of what were the military hospitals in need? It would be easier to answer this question if it were reversed, and it were necessary to enumerate not those things which they wanted, but those with which they were fully supplied." Again he says: "The shortsightedness and inactivity of the military administration in this case cannot be placed to the account of the hospitals themselves." Among other things, Richter complains bitterly of the absence of clothing.

All society is anxious to know that such events should not be repeated in a future war. It is interesting to see what improvements have been made in this department of military administration.

Let us take France as an example. In 1870 France committed the unpardonable sin of considering herself ready for war. In the present day we also hear complaint as to the possible failure of arrangements to fulfil in practice what has been claimed for them. When in 1881 General Farre was questioned as to the sending of dressing materials for the Algiers and Tunis armies he replied: "Our ambulances will in no respect show deficiencies." In reality it was shown that in this

respect nothing was ready. Notwithstanding the fact that all the necessary material was bought with a liberal hand, it did not reach its destination. It even appears that in Kef (May 1881) after numberless vain applications the officers were obliged to raise a subscription among themselves for the purchase of sugar, wine, and coffee for the sick in the improvised ambulances. In Grardimay in May 1891 the wounded and sick of General Lozhero's column awaited for twenty days the arrival of material from the regular ambulance. In Gulletta in May and June 1881 the sick officers were compelled to live at their own expense in the wretched coffee-houses of the town ; and on the whole extent of coast from Gulletta to Philippeville the ambulances and hospitals were overcrowded to such an extent that by August no more could be admitted, and the sick from Gulletta had to be sent down to the coast and set on board ship, until finally they were again brought to Philippeville. At Pont de Fahs in October 1881, 4000 sick men of Filbert's brigade, finding themselves left to the care of a single doctor, were compelled, owing to the absence of transport, to await the arrival of the wretched waggons hired from the natives in order to bring them to Tunis.

The state of affairs in the Italian army in the Abyssinian war was no better.

There is reason for turning attention to the aid of the wounded and sick, the more so since the new weapons have made the position of affairs infinitely worse ; increase in the number of wounded will increase proportionately the difficulties of the ambulance corps ; the time for its operations is diminished, thanks to the greater accuracy, rapidity, and range of fire which sometimes must make it impossible to carry off the wounded and grant them first aid ; while there is an inevitable loss of working force caused by greater distance of the dressing stations from the fighting line which the immense range of modern fire-arms must involve.

One of the most celebrated surgeons of the century, Professor Billoth, declared that in order to give full assist-

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ance to the wounded, the sanitary corps must be equal in strength to the combatants. This is in no way an exaggeration, but merely expresses the fact that with the modern conditions of war, and the probable great length of battles, it will be almost impossible fully, immediately, and satisfactorily to give medical assistance to the wounded. The very work of removing the wounded must be carried on under fire, and will be extremely difficult. The ambulance servant must pick his way with his burden, bending down to avoid the shots if both he and the wounded man he bears are not to be killed. The work of collecting the wounded will be made even more difficult by the fact that they must be sought for in the covered positions where they lie. And delay in the carrying off of the wounded means an increased percentage of deaths, not only from loss of blood but even from hunger.

In a time when rifle and artillery fire were beyond comparison weaker than they are now, those who were left unhelped on the battlefield might hope for safety. But now, when the whole field of battle is covered with an uninterrupted hail of bullets and fragments of shells, there is little place for such hope. But even here the list of terrors of a future war does not cease.

The Bavarian Chief Military Physician Porth calls attention to yet another danger which may threaten the wounded. After the battle of Worth he set out with his assistants to aid the wounded, and came across a great number of Turcos who needed assistance. After this, on entering a wood he came across great walls of corpses lying across the road. The lower parts of these walls of corpses were constructed regularly, while the upper parts were formed of corpses lying in disorder. These last, apparently, were corpses of soldiers struck by bullets after the wall had been built. Porth examined the corpses carefully in order to see if any living men were among them, but found that all were dead. "This will easily be understood," observes Dr. Porth, "as the weight of those on top and fresh bullets had finally killed off any who had

been placed there alive." Porth supposes that such walls of corpses will also be raised in a future war. Trenches constructed in haste have not any connecting passages behind, so that the reinforcements sent to the front will have to pass an exposed space, and hastily jumping into the trenches may cause injuries to the wounded already lying there. When the trenches shall have become encumbered with dead or those considered as dead, it will be necessary to throw these out; they cannot be thrown out behind, since such a course would result in impeding the path of reinforcements; they will be placed of necessity, in front of the trench, that is, on the side of the enemy, thus forming a breastwork. "To be cast there alive," adds Dr. Porth, "will be the best of fates, for a new bullet will shortly end all sufferings, while those wounded who are left lying in the trenches will suffer long."

It is plain that the introduction of long-range rifles, the improvement of artillery, the immense increase in the strength of armies, and finally, changes in the rules of war, demand the introduction of radical reforms in the methods of assisting the wounded on the field of battle. For the benefit of the ambulance service, it would be absolutely necessary to give independence to the authority to which is subject both official and voluntary organisations for aiding the wounded.

Without voluntary co-operation, without public participation in time of war, it would be impossible to manage, but this participation must be regulated in good time. In Russia it is especially necessary to constitute committees with authority: (1) Over the hospitals; (2) over the supply of medical stores; (3) over the transport of the sick and wounded; (4) over the equipment of the hospitals with domestic necessities. The rational organisation of such a committee would result in immense benefit.

We will quote here some more evidence as to the necessity for improvement. Writing of the Russo-Turkish war, Pigorof says: "In the end of September, on our inspection of the hospitals we came across hundreds of cases of frost-bitten feet, and in answer to our inquiries

found that almost all ascribed their sufferings to wet boots, which for a long time had been worn without taking off. If *valenki* (felt over-boots) had been given only to half the men in a company it would have saved many from frost-bites, as it would have been possible for the soldiers to take off their boots and dry them."

Those who control the lot of soldiers must remember that although a large increase in the ambulance service would result apparently in a loss of fighting strength, in reality it would directly result in strengthening the fighting forces by increasing the percentage of sick and wounded who would return to the front, by diminishing the mortality and by raising the spirits of soldiers in consequence of the conviction that care would be taken of the victims.

And in the present time, when in a battle between the armed forces of Europe, the mechanism of destruction is so perfect that shells may be thrown with unexampled rapidity to unheard-of distances, creating on every field a vast area of absolute destruction; when owing to power of fire attacks can only be made in loose formation, and every soldier may shirk the battle—the spirit of armies has a much greater importance than before.